Saco River Corridor Commission

"Communities Working Together To Protect Our Rivers"

February 1, 2019

Senator Cathy Breen, Chair
Representative Drew Gattine, Chair
Committee on Appropriations and Financial Affairs
5 State House Station
Augusta, Maine 04333

Report on the Saco River Corridor Fund

Dear Senator Breen and Representative Gattine,

The Saco River Corridor Commission was legislatively created in 1973 to oversee and administer The Saco River Corridor Act. This Act was designed through extensive public involvement to prevent inappropriate development and land uses from occurring within 500 feet of the Rivers in the Corridor and up to 1000 feet in the 100-year floodplain. The mission and purpose of the Commission is to protect public health, safety, and the quality of life for the State of Maine through the regulation of land and water uses, protection and conservation of the region's unique and exceptional natural resources, and through the prevention of impacts caused by incompatible development.

The Saco River is highly regarded as a drinking water source which serves as a sole source water supply for several communities. Regulations and performance standards are implemented by Commissioners in order to develop ways to most effectively minimize any detrimental impacts to the water quality of this critical natural resource. The Commission works with citizens, municipalities, code enforcement officers, non-profits and all other groups with a vested interest in land and water use protections in the 20 municipalities which make up the Saco River Corridor in order to ensure the collective health of the entire watershed is protected.

Part of the revised statute included Public law 1997, chapter 330 creating the Saco River Corridor Fund. The fund is derived from a 1% fee on the sale of water and fire protection services by a water utility that draws water either from the Saco River or from a groundwater source under the influence of the river. The purpose of the fund is to preserve existing water quality and prevent the deterioration of water supplies in the Saco River, the Ossipee River and the Little Ossipee River within the Saco River Corridor, as created in section 953, by partially underwriting the administration and operations of the Saco River Corridor Commission, as established by Title 5, section 12004-G, subsection 13.

The funds received by the Saco River Corridor Commission this past fiscal year were used primarily in the water quality monitoring program including the management, operation and overall logistics and also in the day to day operations of the office. Total received from this fund for the year ending in 2018 was $62,538.88. I have enclosed a map of the 35 sample site locations tested along 100 river miles in the Corridor bi-weekly from May-September every year. This program is utilized by the towns and Maine Water as a potential early warning system for their public water supply operations.

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Additional program elements supported by the fund include the hiring of a water quality coordinator to assist volunteers and staff in collecting samples, as well as carry out all necessary requirements of our DEP and EPA approved QAPP (Quality Assurance Project Plan) in order to ensure the quality of the data.

Also, the fund was used to support a part time position on an as needed basis for assisting with environmental compliance checks as well as the enforcement of violations of the Saco River Corridor Act. This fund was also used to support the creation of an ARC GIS mapping system of the Corridor, including the SRCC jurisdictional buffers, zoning districts, the FEMA flood mapping system, tax map parcel overlays and our water quality monitoring sampling location and data points. We continue to work on the final touches of the program and once completed this mapping program will be accessible for communities. Remaining funds are used in the day to day operations of the Commission. I have enclosed a copy of the SRCC budget. As you can see, our budget is comparatively small and made functional by the addition of funds from LD 1155. Our General Fund allocation is $46,960 which is applied to salaries, overhead and other expenditures such as insurance, worker's compensation and employment taxes.

The increase in monies to this fund is due to a rate increase which came about in two ways. Maine Water LLC contacted us in 2014 indicating that two issues had occurred that would affect the funds received through LD1155. Because of contracts with other municipalities in addition to Biddeford and Saco, water had been sold to other municipalities which means the SRCC would get additional funding. I believe the increase was that, due to drought conditions, additional municipality needs were factored in to the water budget and more water was sold than had been anticipated. Also, Maine Waters had approached the (PUC) for a rate increase. This amounted to the additional $10,000 annually to the SRCC with the final amount dependent on the total volume of water sold. This additional money is used exactly as mentioned before. Next year's allotment through this fund could change due to several factors, however this increase has allowed us to expand our programs and oversight of the Corridor in many ways. This fall we used the additional monies from the fund surplus to replace our outdated water quality equipment.

As development continues to resume in our communities at a quicker pace it will be extremely important to continue to monitor the water quality of the rivers and continue to regulate land use within the Corridor. The funds from LD 1155 will continue to allow the Commission to ensure optimum protection of these lands and waterways and protection of the quality of life in the State of Maine. If there are any questions on the information contained within this report, please feel free to contact me.

Sincerely,

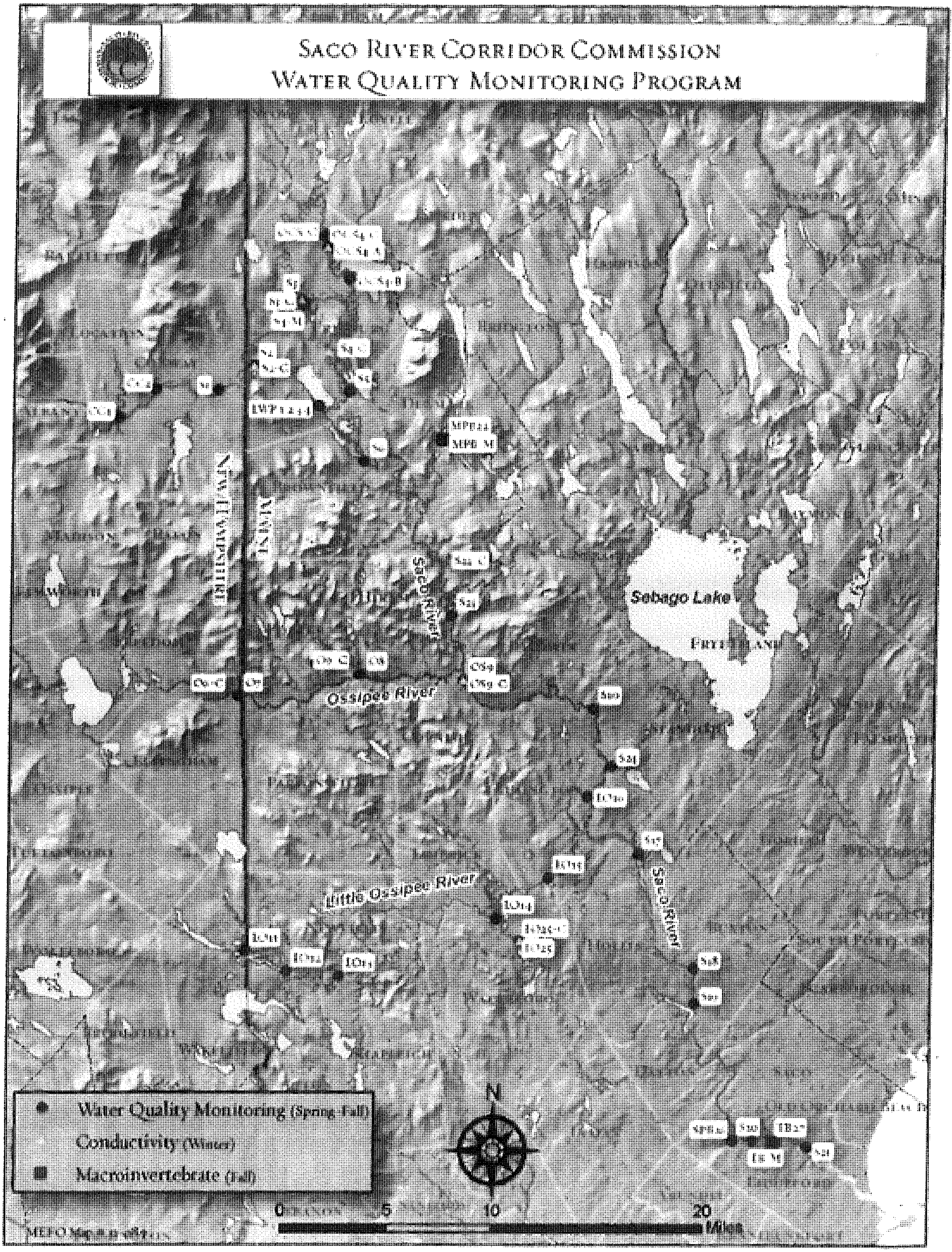
Dalyn P. Houser

Executive Director

Enclosures

Saco River Corridor Commission Proposed Budget Fiscal Year 2017-18

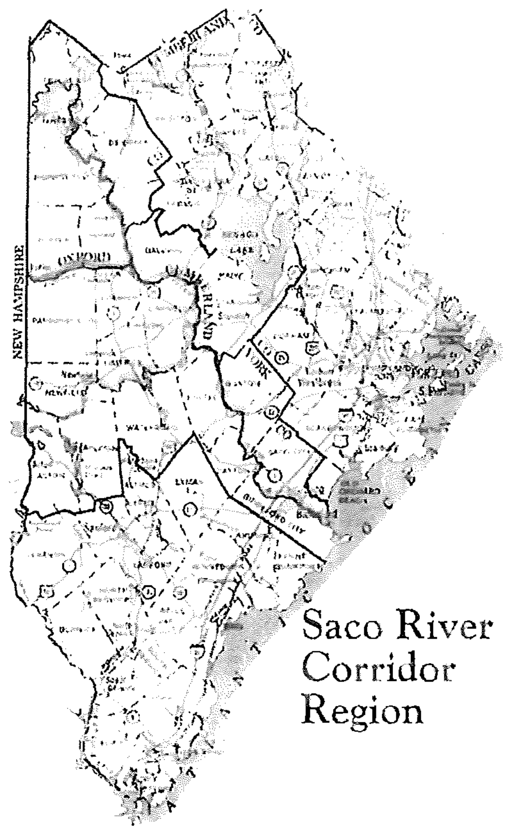
	2016-17 BUDGET	ACTUAL	2017-18 PROPOSED BUDGET
Revenues:			
Operational Funds			
101 Application Fees	9,000.00	8,445.00	8,500.00
102 Municipal Appropriations	20,000.00	20,000.00	20,000.00
103 State Appropriations	28,000.00	28,000.00	28,000.00
104 L.D. 1155	50,000.00	63,238.00	50,000.00
105 Donations/Miscellaneous	-		-
106 County Funding	-		-
107			
Dedicated Funds			
140 WQM (Municipalities)	3,600.00	4,800.00	4,000.00
141 WQM (Grants)			
142 WQM (State)	18,960.00	18,960.00	18,960.00
143 WQM (Donations)			
	$ 129,560.00	$ 143,443.00	$ 129,460.00
Expenditures:			
Salaries & Benefits			
201 Executive Director	40,000.00	40,000.08	40,000.00
202 Administrative Assistant	36,000.00	36,840.00	37,300.00
203 Environmental Compliance Evaluator	3,800.00	2,089.50	3,000.00
206 Unemployment Contributions - See #209			
207 Worker's Compensation	550.00	555.62	550.00
208 Health Insurance	6,400.00	6,006.51	6,400.00
209 Employment Taxes and contributions	6,930.00	6,936.76	7,000.00
Total Salaries & Benefits	$ 93,680.00	$ 92,428.47	$ 94,250.00
Overhead			
210 Rent	6,600.00	6,600.00	6,600.00
211 Telephone/Internet	3,400.00	3,518.85	3,400.00
212 Internet Access & Web Page	150.00	-	150.00
213 Travel - Regulatory	1,300.00	1,063.04	1,200.00
214 Postage	550.00	538.65	550.00
215 Printing	400.00	359.25	350.00
216 Advertising	300.00	561.33	300.00
217 Supplies	800.00	707.33	800.00
218 Capital	643.86	867.42	800.00
219 Contingency	850.00	910.14	850.00
220 Maps and Publications		523.16	
221 Contractual Services	600.00	781.21	500.00
222 Business Owners Insurance	575.00	574.00	575.00
223 Electricity	800.00	849.29	850.00
224 Legal	-	0	-
225 Education	-	0	-
226 K-1 Heating Oil	1,500.00	808.69	1,000.00
Total Overhead	$ 18,468.86	$ 18,662.36	$ 17,925.00
Water Quality Monitoring			
240 Personnel	7,500.00	8,970.30	8,000.00
241 Lab Testing	6,700.00	6,910.00	6,700.00
242 Equipment	1,400.00	2,760.73	1,400.00
213 Travel - WQM	3,000.00	2,343.38	2,800.00
243 Supplies	500.00	546.62	500.00
244 Miscellaneous	450.00	365.45	450.00
Total Water Quality Monitoring	19,550.00	21,896.48	19,850.00
Total Expenses	$ 131,698.86	$ 132,987.31	$ 132,025.00



SACO RIVER CORRIDOR COMMISSION
WATER QUALITY MONITORING PROGRAM
Saco River
Sebago Lake
Ossipee River
Little Ossipee River
N
Water Quality Monitoring (Spring-Fall)
Conductivity (Winter)
Macroinvertebrate (Fall)
0
5
10
20
Miles

Saco River Basin
Water Quality Monitoring Program

2017 Season Summary Report



Prepared by:

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An Introduction

Twenty years ago the number one question we received was: *"How is the quality of the water in the Saco Basin?"* In answering that question we relied on the knowledge that Class A and AA waters stretch over vast segments of the rivers within the corridor and also that the rivers have a relatively natural and unspoiled look. But, there was something missing. Did we actually know the quality of the water? Were we really striving towards our agency mission to "protect public health, safety and quality of life..." by not obtaining credible scientific data before answering the question being asked? The decision was made, and when the budget caught up, the Saco River Basin Water Quality Monitoring Program officially began.

The Saco, Ossipee and Little Ossipee Rivers are in a dynamic and fluctuating state.

For the Commission, a sustainable water quality monitoring program is based on five important steps.

1) **Generally characterize water quality and gather baseline data;**
2) **Understand general condition of water in each designated area of the river;**
3) **Test to determine if degraded water quality exists;**
4) **Decide what further testing/actions or further investigation is needed to diagnose and solve problems;**
5) **Broaden the understanding of water quality in the community through outreach and education.**

The Commission

Over 45 years ago, a group of citizens gathered to discuss the importance of clean water, clean water that would ensure a healthy future for generations to come. This group approached the Maine State Legislature with their concerns and ideas. In 1971, the 105th Maine State Legislature concluded that *"the Saco River, along with its major tributaries, the Ossipee and Little Ossipee Rivers, are natural rivers of great scenic beauty and unique character, possessing outstanding recreational, historical, educational, scientific, cultural, wilderness and environmental values of great present and future benefit to this generation and all succeeding generations..."* The Legislature further concluded that *"due to their* [Saco, Ossipee and Little Ossipee Rivers] *locations and the trends which are threatening their values that it is in the best interests of the people of the State to provide for the orderly protection and proper development of the values of the Saco River Corridor..."* In order to make sense of these conclusions, the legislature created the Saco River Environmental Advisory Committee and charged them with devising a plan for action to ensure water quality for future generations. A year later, on the strength of the committee's findings, the 106th Legislature established the Saco River Corridor and subsequently created the Saco River Corridor Commission in order to carry out the purpose of the Saco River Corridor Act (Title 38 M.R.S.A. Section 951 et. seq.).[1]

[1] The Saco River Corridor – The View From the Valley, Prepared by the Saco River Environmental Advisory Committee, April 1973

Four decades later we have seen the water classifications within the Saco River Corridor increase from B1, B2, and C to class A and AA over large river segments. What is responsible for this positive step forward in water quality? It isn't one individual or group, but a collaborative effort on the part of towns, citizens, and the SRCC over the past 45 years. The change in water quality is the result of all decisions made regarding land use and appropriate safeguards put in place that encourage wise development. This is exemplified in The Saco River Corridor Act.

The Corridor

The area of study for our program focuses on the twenty municipalities within our regulatory jurisdiction. The corridor, as defined by the Act, *"includes the Saco River from the landward side of the rock jetty in Saco Bay to the New Hampshire border; the Ossipee River from its confluence with the Saco River to the New Hampshire border; and the Little Ossipee River from its confluence with the Saco River to the New Hampshire border at Balch Pond. The corridor also includes the lands adjacent to these rivers to a distance of 500 feet as measured on a horizontal plane from the normal or mean high water line of these rivers to the edge of the 100-year floodplain if that extends beyond 500 feet, up to a maximum of 1,000 feet."*

The Saco River Basin

The Saco River Basin covers an area of approximately 1,700 square miles: 863 in Eastern New Hampshire and 837 square miles in Western Maine. That is equal to an area of 1.1 million acres, with 552,000 of those in New Hampshire and 536,000 in Maine. The Basin encompasses all or parts of sixty-three municipalities within the two states. Elevations in the basin range from 6,288 feet, the Summit of Mount Washington located in Sergent's Purchase, New Hampshire, to sea level at the mouth of the river in Saco and Biddeford, Maine.[2]

The three major tributaries of the Saco River are the Swift, Ossipee, and Little Ossipee Rivers. The Swift River flows from the northern side of Mount Kancamagus in Livermore, New Hampshire. The Swift flows easterly for 21 miles before it enters the Saco River in Conway, New Hampshire. The Swift River drains an area of 114 square miles and has a total fall of elevation over 1,400 feet.

The Ossipee River begins at the outlet of Ossipee Lake in Effingham Falls, New Hampshire. It flows easterly for 18 miles before entering the Saco in Cornish, Maine. It drains a 455 square mile area and falls 140 feet from beginning to end.

The Little Ossipee River begins in Balch Pond which lies within Wakefield, New Hampshire, and Acton and Newfield, Maine. The Little Ossipee also flows in a meandering, easterly course until it joins with the Saco in

[2] The Saco River – A Plan for Recreational Management, Prepared by Southern Maine Regional Planning Commission, October 1983

Limington, Maine. It drains an area of 187 square miles and has a total fall of 340 feet in elevation.

The Saco River flows for a total of 130 miles from the outlet of Saco Lake in Crawford Notch, New Hampshire until it reaches the Atlantic Ocean in Saco and Biddeford, Maine. The river falls in elevation a total of 1,900 feet. Before the Saco reaches Maine, it has already descended approximately 1,500 feet in elevation.[3]

Another section of the Saco River not to be forgotten is the Old Course, or once referred to as the "Great Bend" by early settlers of Fryeburg, Maine. This 32 mile northern loop of the river was cut off when a new eighteen mile channel was built in the early 1800's. The Old Course loop flowed through and around vast farming lands which were also within the floodplain. Located within the floodplain, and also thirty feet lower than surrounding lands, these farming areas were susceptible to overflow during flood periods. This annual overflow made it impossible for farmers to plant or sow their farmlands until after the first of June due to still water remaining on the land. The creation of this channel was the solution to this problem.

After about five years of discussions and debate the canal was made operative. The waters that once took their time to flow through the 32 mile loop now rush through the new eighteen mile channel leaving the once overflowed farmlands with much less water and the "best farming land in the country."[4]

According to the most recent census information, there are 156,685 people living within the sixty-three towns that fall within the Saco River Basin. The percentage split between the two states is 70/30 with Maine supporting the greater number of residents.

What We Monitor For

We test annually for the following eight parameters: pH, dissolved oxygen, turbidity, temperature, conductivity, total Kjeldahl nitrogen, Total Phosphorus, Alkalinity and Escherichia coli. The first five parameters are monitored using equipment produced by and purchased from the HACH Company out of Loveland, Colorado. The last five parameters are monitored by transporting water samples daily to Katadyn Laboratories located off U.S. Route One in Scarborough, Maine.

The following brief explanations describe each of these parameters and how the valuable information they provide is important both individually and in combination with the others.

pH – The term pH means "potential of hydrogen". pH is measured on a 1.0 to 14.0 scale in order to determine the acidity or alkalinity of a substance. Specifically, this scale is measuring the concentration of hydrogen ions (H^+) and hydroxyl ions (OH^-) which are both contained in water. ($H^+ + OH^- = H_20$)

[3] Saco River Basin USDA Cooperative Study – Final Report, December 1983

[4] Fryeburg, Maine, an Historical Sketch, By John Stuart Barrows. Pequawket Press, Fryeburg, Maine, 1938.

Sometimes these ions are floating free and other times they are bound together with other ions such as sodium (Na^+) or chloride (Cl^-). Whenever you have more hydrogen ions floating free all by themselves, in comparison with hydroxyl ions, the water would be considered acidic and would have a pH of less than 7.0. At a pH of exactly 7.0 (neutral) the concentration of both free hydrogen ions and hydroxyl ions is equal. Whenever you have more hydroxyl ions floating free, compared with hydrogen ions, the water would be considered alkaline and would have a pH of more than 7.0.

Everything that our rivers come in contact with influences the pH scale including uses as well as natural processes including agricultural fields, lawns, roadways, and woodlands and stormwater. The ability of aquatic organisms to complete a life cycle greatly diminishes as pH falls below 5.0 or exceeds 9.0. The ideal range is between 6.5 and 8.2. Acid rain and other contributions and the systems own alkalinity (or buffering ability) are all influences on the pH.

Dissolved Oxygen –Most living organisms in our river require oxygen to survive. That oxygen is available to them in a gaseous state and is called dissolved oxygen. This amount of oxygen is commonly expressed as a concentration in terms of milligrams per liter (mg/L), or as a percent saturation. Milligrams per liter is the amount of oxygen in a liter of water. Percent saturation is the amount of oxygen in a liter of water relative to the total amount of oxygen that the water can hold at that temperature.[5] There are many ways that oxygen can find its way into the water. The primary methods are through contact with the atmosphere and photosynthesis.

Accurate dissolved oxygen readings are dependent on temperature, atmospheric pressure, and salinity. Cold water has the ability to hold more oxygen versus warmer water. Increased atmospheric pressure also increases waters ability to hold more oxygen. Salinity, on the other hand, decreases the waters solubility. The amount of dissolved oxygen in the water is in direct relation to that water"s ability to support aquatic organisms. Water with very low dissolved oxygen content (less than 5 mg/L), is often caused by inappropriate inputs to the system. Dissolved oxygen is essential for basic metabolic processes of most plants and animals and is also consumed by bacterial decomposition of dead plants and animals.

Dissolved oxygen levels also rise from morning through the afternoon as a result of photosynthesis, reaching a peak in late afternoon. Photosynthesis stops at night, but plants and animals continue to respire and take in oxygen. As a result, dissolved oxygen levels fall to a low point just before dawn.

Depletions in dissolved oxygen can cause major shifts in the kinds of aquatic organisms found in water bodies. Species that cannot tolerate low levels of dissolved oxygen – will be replaced by a few kinds of pollution-tolerant organisms. Nuisance algae and anaerobic organisms (those that live without

[5] Volunteer Stream Monitoring: A Methods Manual, USEPA, EPA 841-B-97-003, 1997

oxygen) may also become abundant in waters with low levels of dissolved oxygen.

Turbidity – If you are trying to determine how turbid a substance is, you are measuring the clarity in a fluid. The greater the turbidity; the murkier the water. Higher levels of turbidity are usually caused by turbulent flow picking up large quantities of particulates, such as after a storm event or rivers banks that are eroding, both natural and man-made. Other causes are waste discharge, urban runoff, abundant bottom feeders that stir up bottom sediments, or algal growth.

These high levels of suspended particles, which absorb heat from the sun, increase the water's temperature and thus cause oxygen levels to fall. The lower oxygen levels have an effect on photosynthesis which in turn has an additional effect on lower oxygen levels. Suspended solids can clog fish gills, reduce growth rates, decrease resistance to disease, and prevent egg and larval development of aquatic life. Particles can also gather at the bottom of waterways and smother the eggs of fish and aquatic insects.

Temperature – Determined by the average kinetic energy (energy obtained by being in motion) in the molecules of the substance being measured. In other words, the faster the molecules are moving the more energy they have and the higher temperature. Slower molecules have less energy and therefore a lower temperature.

The metabolic rates of organisms increase with increasing water temperature. An increased metabolism increases the need for oxygen. Temperature also influences the amount of oxygen dissolved in water and the rate of photosynthesis by algae and larger aquatic plants.

Activities that can affect temperature include industrial discharge of water used to cool machinery (also known as thermal pollution); the cutting of trees that once shaded the water, and soil erosion which increases the suspended solids making the water more turbid.

When the water temperature increases, so too does the rate of photosynthesis and plant growth. The more plants that grow means that more plants will die. As the plants die, they are decomposed by bacteria that consumes oxygen. As you can begin to see, these parameters do not result in a single effect. Each of the water quality indicators work together in a partnership of sorts to bring you the numbers you see in this report.

Organisms that thrive in cooler water temperature (13° C and below) can include trout and mayfly nymphs. Those that prefer warmer waters (20° C and above) are bass and numerous plant life. The middle range (13° C to 20° C) supports salmon, trout, water beetles, and limited plant life. There are few organisms that can tolerate extreme heat or cold.

Escherichia coli – Whether we know it or not, our intestines are where a tiny bacterium called *Escherichia coli* (a type of fecal coliform) calls home. Actually, *E. coli* lives in the intestines of all warm blooded mammals. Our program tests for this bacteria as a possible indicator that human wastes are entering the water supply. There are many ways that this can happen including swimmers at a beach, campers who don't properly bury their waste, or from a failing septic system. *E. coli* itself is not usually pathogenic (disease producing). There are however, some strains which can cause gastrointestinal disturbances. Whenever exposed to excessive amounts of *E. coli* colonies through water contact (bacteria can enter the body through cuts on the skin, the nose, mouth, or the ears) there can be a variety of ways humans can react including fever, vomiting, or ear infections.[6]

When you have high fecal coliform counts (beginning at 200 colonies per 100 mL of water) a person swimming is at a greater risk of developing an adverse reaction to the present bacteria.

In order to obtain an accurate assessment of the bacteria count, five samples are taken at one time for testing. Current State of Maine standards require that E. coli results from the five samples must not exceed 126 colonies per 100 milliliters of water in order to be safe for swimming.

Nitrogen – All plant and animal tissues require nitrogen for growth. Approximately 80 percent of the volume of the earth's atmosphere is made up of nitrogen. There is a constant nitrogen cycle which occurs on earth between the air and the soils. Throughout that cycle, nitrogen takes on many forms.

Nitrogen can exist as nitrate (NO_3), and as a nitrite (NO_2). Nitrates are an important part of fertilizers used in agriculture and they easily leach from soils. Nitrites, unlike nitrates, are toxic to plants in great concentrations. Bacteria found naturally in soils use nitrites in the conversion process of Ammonia Nitrogen (NH_4) into beneficial nitrates.

Total Kjeldahl Nitrogen is a combined measurement of all three forms of nitrogen discussed (NO_3, NO_2, and NH_4).

Phosphorus – The element phosphorus exists in many different forms. In one form it is poisonous and can burn our skin on contact. In another it exits as part of our DNA structure. Phosphorus can also be found within our water supply in the form of phosphate (PO^{-}_4-P).

Phosphorus is considered an essential element of life. Phosphorus provides plants and animals with necessary nutrients in order to undergo metabolic processes. Of course, there can be too much phosphorus within a water supply which can lead to an "algal bloom". An algal bloom is an indicator of *cultural eutrophication*. Cultural Eutrophication is the "overenrichment of aquatic ecosystems caused by human activity, such as industrial pollution, septic tank leachate, or agriculture". When waters become overly enriched there is an increase in the levels of nutrients such as phosphates (or nitrites) which leads to a rapid increase in plant growth. There is a normal "aging" process that our waterways undergo in which plant matter naturally dies and is decomposed by organisms within the water. Whenever you have too much plant growth, the decomposing organisms (which need oxygen to

[6] Tortora, Funke, Case, *Microbiology An Introduction*, 8th Edition, San Francisco, CA, Benjamin Cummings, 2004.

survive) essentially are working in overdrive and begin to use up available oxygen levels. Low oxygen levels lead to death of organisms including fish. This "aging" process occurs constantly but at a slow rate. *Cultural Eutrophication* provides an explanation of how human influences can adversely affect a natural system.[7]

Full data sheets covering all of the parameters we test for can be examined on line, or individual sites can be chosen for the historical data.

[7] Art, Dictionary of Ecology and Environmental Science, New York, NY, Henry Holt and Company, 1993.